REMARKS

Examination of the present application is to be based on claims 1 to 23. The present set of claims contains a total of twenty-three (23) claims, six (6) of which are independent.

The office action of December 4, 2003 has been carefully examined.

I. Claims

Applicant has added new claims 17 to 23. Support for new claims 17 to 23 can be found, for example, in Figures 7 to 16 and related portion of the specification. No new matter has been added. Amendments to the existing claims, in particular with reference to claims 2, 3, 4, 6, and 8 have been made for clarity purpose only and will be discussed in detail throughout the present response when making reference to the 35 USC 112 rejections of the Examiner.

II. Drawings

1.

New Figures 17 and 18 have been introduced by the Applicant. Support for new Figure 17 can be found in original claims 6 and 7.

Support for new Figure 18 can be found in the embodiment described in the specification from page 14 line 21 to page 15 line 5.

Reference to new Figures 17 and 18 has been added to the specification. See the paragraph from page 14, line 21, to page 15, line 2 (where Figure 18 is referenced to) and the paragraph on page 19, lines 23-29 (where Figure 17 is referenced to).

2.

In section 4 of the Action, the Examiner objects to the drawings for failing to comply with 37 CFR 1.84 (p) (5). In particular, the Examiner points out that the following reference signs are not mentioned in the description: in Figure 1, item "θ", in Figure 8, item "TK", in Figure 12, item "48", in Figure 16, items "57", "60", "61", and "62".

The Applicant has amended the drawings and the specification to overcome the objections of the Examiner.

In particular, with reference to item "θ", the paragraph on page 8, lines 1-12 has been amended to include reference to the item "θ". Support for the amendments to the paragraph can be found in Figure 1 of the present application and in the incorporated US Pat. No. 5,479,911 at column 3, lines 20-22, as shown in the "Amendments to the Specification" section of the present amendment.

Further, with reference to item "TK", shown in Figure 8, explicit reference to such item has been made in the amended paragraph from page 10, line 18 to page 11, line 7, as shown in the "Amendments to the Specification" section of the present amendment.

Moreover, with reference to item "48", shown in Figure 12, explicit reference has been made in the amended paragraph at page 16, lines 4-16, as shown in the "Amendments to the Specification" section of the present amendment.

In addition, with reference to items "57", "60", "61", and "62" of Figure 16, the description of such items, supported by Figure 16, has been incorporated in the paragraph at page 19, lines 3-16, as shown in the "Amendments to the Specification" section of the present amendment.

Therefore, the Applicant submits that the application as amended is compliant with the requirements of 37 CFR 1.84(p)(5) and that the objections of section 4 have been overcome.

3.

In section 5 of the Action, the Examiner objects to the drawings for failing to comply with 37 CFR 1.84 (p)(4). In particular, the Examiner points out that:

1) reference character "11" has been used to indicate both grooves (page 8, line 3) and a hub (page 10, line 23),

2) reference character "23" has been used to designate both a cutting wheel (page 9, line 8) and a disc base member (page 9, line 10),

3) reference character "24" has been used to designate both a supporting disc (page 9, line 9) and a center (page 9, line 10),

4) reference character "27" has been used to designate both diamonds (page 9, line 19) and particles (page 9, line 24),

5) reference character "37" has been used to designate both a tip (page 12, line 23), an annular ring (page 12, line 26), an annular corrugated singulation blade (page 13, line 4), and corrugated rings (page 13, line 10), and

6) reference character "38" has been used to designate both a shoulder (page 13, line 2) and a shelf (page 13, line 7).

The Applicant has complied with item 1) by amending the paragraph from page 10, line 18 to page 11, line 7, to replace the term "hub 11" with the term "hub 13". The Applicant has complied with items 2) and 3) by amending the paragraph on page 9, lines 7-12 to cancel reference to numerals 23, 24 from the terms "wheel 23" and "disc 24", respectively. The Applicant has complied with item 4) by amending the paragraph from page 9, line 22 to page 10, line 5 to replace the term "particles 27" with the term "particles 270". Numeral 270 is being introduced with the present response. Figure 6 has been correspondingly amended. The Applicant has complied with item 5) by amending the paragraph at page 12, lines 22-29 to cancel reference numeral "37" from the term "tip 37" and to add the wording "or annular corrugated singulation blade" between the terms "annular ring" and "37". Support for the added term "annular corrugated singulation blade" can be found at page 13, line 4 of the present application. Similarly, the Applicant has amended the paragraph from page 12, line 30 to page 13, line 12 to replace the term "corrugated rings 37" with the term "annular rings 37". The Applicant has complied with item 6) by amending the paragraph from page 12, line 30 to page 13, line 12 to replace the term "shelf 38" with the term "shoulder 38", as disclosed in the same paragraph.

Therefore, the Applicant submits that the application as amended is compliant with the requirements of 37 CFR 1.84(p)(4) and that the objections of section 5 have been overcome.

3.

In section 6 of the Action, the Examiner objects to the drawings because, according to the Examiner, it is unclear how Figures 7-14 relate to one another.

Before responding in detail to the above objection, the Applicant points out that some paragraphs of the specification and drawings have been amended. In particular, the paragraph at page 16, lines 4-16 specifies the presence of a "support 48" of the "drill pipe 45". Additionally, the paragraph at page 17, lines 4-29 correctly makes reference to Figures 13 and 14. Further, Figure 5 has been amended to cancel the downward pointing arrow stemming from numeral 25.

In this respect, Applicant has amended the specification and the drawings and submits that in the application as amended relation between the figures is clear.

The blade of Figure 7 is an annular disc blade having a corrugation as shown in Figure 8. The blade of Figure 9 is an annular disc blade having a corrugation as shown in Figure 8, and a support 36 to which the blade is attached. Therefore, the blade of Figure 7 and the blade of Figure 9 are different embodiments of a blade having a corrugation as shown in Figure 8.

Figure 10 is a sectional view of Figure 9. The Examiner will note that Figure 9 shows both a disc blade 37 and a support 36. Both the disc blade 37 and the support 36 are shown in Figure 10. Figure 10 is a depth view of Figure 8. In other words, Figure 10 is a view of Figure 8 going into the plane of the paper sheet.

Figure 11 does not show a blade as such. Figure 11 shows an embodiment of a method for making a blade. In particular, Figure 11 shows an electroforming mandrel where the blade is plated.

Figure 12 shows a cylindrical embodiment of the blade, where corrugation is present on the lateral external surface of the blade. The cylindrical blade is hollow and is received by a portion 46 of a support 48.

Figure 13 shows a schematic sectional view of Figure 8. Turning back to the corrugation shown in Figure 8, the Examiner will note that Figure 8 shows top side walls (see numeral 34 to the left side of Figure 8), bottom side walls (see numeral 34 to the right side of Figure 8), and transition walls (see numeral 44 in Figure 8). Those walls are also shown in the sectional view of

Figure 13. In particular, a top side wall is indicated with numeral 42, a transition wall is indicated with numeral 44, and a bottom side wall is indicated with numeral 43.

Figures 13 and 14 are different from Figure 10 in the sense that the view of Figures 13 and 14 is lateral with respect to the view of Figure 10.

Figure 13 shows a sectional view of Figure 8 before cutting. Figure 14 shows a sectional view of Figure 8 after extensive cutting.

Therefore, with reference to the comments of the Examiner in section 6 of the Action, the Applicant points out the following:

1) The blades of Figures 7 and 9 have the same general shape (disc blades) and corrugation (Figure 8) but are different therebetween.

2) Figure 11 shows a method for making a disc blade as shown in Figure 7 or 9.

3) Figure 10 is a side view of Figure 8 in the sense explained above.

4) The blade of Figure 12 is a cylindrical blade, not a disc blade. The cylindrical blade 47 has a hollow interior. Portion 46 of the drill pipe 45 provides connection between the drill pipe and the blade.

5) Figures 13 and 14 represent views as explained above. With reference to the diamonds 49 in Figures 13 and 14, the following should be noted. In the blades of Figures 7 and 9, the cutting portion is not only the edge of the blades, but also the surface of those blades. Additionally, it should be noted that the diamonds are used both to cut and to reduce wear of the blade.

6) Item 25 of Figure 5 does not point to the cutting edge mass anymore.

Therefore, the Applicant submits that the objections of section 6 of the Action have been overcome.

7.

In section 7 of the Action, the Examiner objects to the drawings for failing to comply with 37 CFR 1.83 (a). According to the Examiner, the following features are not shown in the drawings:

1) the diamonds that are encapsulated; 2) a serpentine matrix shape; 3) an endless flexible ribbon; 4) an adapted portion and 5) an inundating shaped blade.

In answer to the Examiner's comments, the Applicant points out the following:

1) Encapsulated diamonds are shown on the right side of Figure 10; additionally, some of the diamonds of Figures 13 and 14 are indeed encapsulated (see, for example, the tenth and the thirteenth diamond from the bottom of the right side of Figure 13); further, new Figure 18 shows encapsulated particles, as supported by page 14 lines 21-25 of the specification;

2) Reference to the term "serpentine" has been canceled from the claims, thus rendering the objection of the Examiner moot;

3-4) Reference to the endless flexible ribbon and the adapter portion is now present in new Figure 17, which is supported by claim 6 as filed; and

5) Reference to the term "inundating" has been canceled from the claims, thus rendering the objection of the Examiner moot.

Therefore, the Applicant submits that the objections of the Examiner is section 7 of the Action have been overcome.

In view of the above, the Applicant submits that all objections of the Examiner with reference to the drawings have been overcome.

III. Specification

In section 8 of the Action, the Examiner objects to the disclosure because of informalities. In particular, the Examiner objects to:

1) the phrase "raised surfaces 42 and 120 lowered surfaces 43" at page 15, lines 13-14 and proposes such phrase to be replaced with "lowered surfaces 42 and 120 raised surfaces 43"; and

2) the phrase "Figure 12 and Figure 13" at page 17, line 4 and proposes such phrase to be replaced with "Figure 13 and Figure 14".

The Applicant has complied with the above suggestions of the Examiner and submits that the above objection has been overcome.

IV. Claim Rejections - 35 USC 112

In sections 10 of the Action, the Examiner rejects the claims under 35 USC 112, first paragraph. In sections 11-18 of the Action, the Examiner rejects the claims under 35 USC 112, second paragraph.

A.

With reference to section 10, the Examiner submits that the claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular:

1) It is unclear to the Examiner "how the diamonds are encapsulated inside a matrix when they are clearly on the surface shown in Figures 13 and 14."

2) It is unclear to the Examiner "how the diamonds would be used to cut and where the cutting surface actually is."

3) It is unclear to the Examiner "what the endless flexible ribbon and what the adaptor portion for connecting the endless flexible ribbon to the saw blade are."

4) It is unclear to the Examiner "what a drill rod, pipe, and the adaptor portion for connection the blade to the drill rod or pipe are."

In response to the Examiner's comments, the Applicant offers the following comments:

1) As already pointed out above, diamonds in the present application can both be encapsulated and on the surface of the blade. For example, element 37 of Figure 10 shows encapsulated diamonds, while Figures 13 and 14 show diamonds which are both encapsulated and on the surface of the blade. Additionally, new Figure 18, duly supported by the specification as already shown above, makes reference to encapsulated large and small particles of diamonds.

2) The way diamonds are used in blades is known to the person skilled in the art, as shown in US Pat. No. 5,479,911, incorporated by reference in the present application. As also previously stated in the present response, the cutting portion of the blade is a combination of the edge and the surface of the blade. The location and/or dimensions of the diamond particles, in

accordance with the present application, allows a better performance to be obtained in particular in the corrugated blade of the present application. In reply to the Examiner's remark, this is obtained by having a material such as diamond encapsulated in a binder such as nickel, the nickel being less resistant to abrasion than the diamond. Therefore, for example, in an embodiment where all the outer surfaces are nickel, the nickel would abrade until the tips of the diamonds are exposed, the diamonds then acting on the material being cut and, in effect, at least in part protecting the nickel from wearing.

In this respect, reference is made to the specification, from page 10 line 17 to page 11 line 7, wherein, with respect to an embodiment, it is made clear that at least the significant majority of each diamond is encapsulated in the matrix material as the ".....thickness of the matrix material is about ten times the exposed height of the points of the single particle diamonds, the encapsulated diamonds are held very firmly and do not have a tendency to tear loose at any place in the matrix." (See from page 10 line 30 to page 11 line 3). Also, on page 14 from line 21 to page 15 line 2 the specification makes reference to the encapsulated diamonds and to a preferred embodiment wherein "... higher density concentration of diamonds encapsulated in the thin wall nickel matrix results in longer wear at higher cutting speed".

3-4) With reference to the adapter portion, the following is noted. Figure 10 of the present application shows a flange 39 connecting an annular blade 37 to a support 36. Claim 5 of the present application as filed recites an "adapter portion" for connecting the blade to a "blank". Therefore, the flange 39 acts as an adapter portion between the blade and a further element. Similarly, Figure 12 shows a drill pipe "adapted" to receive a cylindrical blade. Therefore, also the cylindrical blade comprises an adapter portion.

With reference to the endless ribbon, disclosed in claim 6 of the application as filed, the following is noted. Claim 6 of the application as filed also discloses an "adapter portion." In claim 6, the adapter portion connects the blade to the endless ribbon. Therefore, the person skilled in the art will easily make an inference that, by means of an adapter portion shaped according to the circumstances, a blade will be able to be connected to a support (like support 36 in Figure 10), a drill pipe (like drill pipe 45 in Figure 12), or an endless ribbon (like the endless ribbon of claim 6 of the application as filed). It should be noted that the term "endless ribbon" is well known to the person skilled in the art and that presence of an endless ribbon is shown in

Figure 17 introduced with the present response. Similarly, it should be noted that a "drill rod" or a "pipe" are well known to the person skilled in the art and that presence of a drill rod or pipe is shown in Figure 17 introduced with the present response.

B.

With reference to sections 13-17 the Examiner points out that:

1) It is unclear how the diamonds are encapsulated in the matrix walls (section 13);

2) There is insufficient antecedent basis for the limitation "the cutting area" of claim 3 (section 14);

3) The phrase "the saw blade becomes concave at the cutting edge and the center of the blade becomes recessed between two parallel cutting side walls" of claim 4 is unclear (section 15);

4) It is not clear what the endless flexible ribbon or the adapter portion of claim 6 are (section 16);

5) It is not clear what the adapter portion for the drill rod or pipe is (section 17).

In response to the above, the Applicant has the following comments to offer:

1) The Applicant believes that encapsulation of the diamonds in the matrix of the present application has been already discussed in the present response. In addition to the comments already provided in the present response, the Applicant also points out that encapsulation is also discussed with reference to the method steps of the present application, as shown, for example, with reference to Figures 15 and 16.

2) The Applicant has amended claim 3 as suggested by the Examiner;

3) The Applicant has amended claim 4 for clarity purposes only. Support for the amendments can be found in Figure 14 and on page 18, lines 4-13. The Applicant believes that the amendments to claim 4 overcome the objection of the Examiner.

4-5) See above explanations with reference to the terms objected to by the Examiner.

Therefore, the Applicant believes that the present application complies with the requirements set forth by 35 USC 112, first and second paragraphs.

* * *

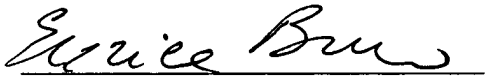
The Applicant respectfully requests that a timely Notice of Allowance be issued in this case. Alternatively, also in view of the comments of the Examiner in section 18 of the Action, the Applicant respectfully requests the Examiner to be provided with an action containing prior art to be cited by the Examiner. The Applicant notes that such prior art has not yet been cited by the Examiner. In view of this, the Applicant respectfully requests the Examiner to provide the relevant art by way of a further non-final action.

Should matters remain which the Examiner believes could be resolved in a further telephone interview, the Examiner is requested to telephone the Applicant's undersigned attorney.

The Commissioner is hereby authorized to charge the fee of $631.00 as itemized below and any required fee in connection with the submission of this paper, any additional fees which may be required, now or in the future, or credit any overpayment to Account No. 50-2638. Please ensure that the Attorney Docket Number is referred to when charging any payments or credits for this case. A separate authorization to charge the above fee is also enclosed.

Respectfully submitted,

Date: June 4, 2004



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